**Electrical Energy: Power & Efficiency**

**(Applied Ch. 11.1, Academic Ch. 12.7)**

**Electrical energy**: the energy provided by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in an electric circuit. Electrical energy is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Electrical devices use electrical energy to do work.

We measure larger amounts of electrical energy most often in watt·hours (W·h) or kilowatt·hours (kW·h).

* + The Joule is a small unit of electrical energy. A watt·hour is 3600 times greater than a joule.
  + 1 kW = 1000 W

**Kilowatt·hour** is the SI unit used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Electricity used during peak times (e.g. during the day on a weekday) can be three times \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Electric Power**: is the rate at which electrical energy is \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_ in a given time.

* Unit of measurement is: **watt (W)**
* 1 watt = 1 Joule per second (J/s)

**COST TO OPERATE A DEVICE:** Use the following equation.

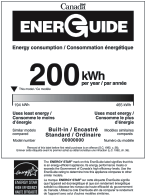
**cost to operate = power used × time × cost of electricity**

**Practice Question:**

1. A laptop computer uses a 0.075 kW adapter when it is plugged in. Electricity costs 5.6 ¢/kW h. Calculate how much it would cost to operate the laptop for 1 year for 24 hours per day (=8760 hours).
2. A cellphone uses 0.003 kW of power. Electrcity costs 5.6 ¢/kW h. Calculate how much would it cost to operate it for 9 hours.

**Efficiency** is a measure of how much energy an electrical device \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Example: older clothes dryer use 800 kW**·**h of electrical energy/year, a new model use 300 kW**·**h /year --- 60 % more efficient



This label provides an estimate of how much electrical energy (measured in kilowatt**∙**hours) the appliance will use in one year.

Practice Question: Which of the following devices is more efficient? A or B?

